Abstract
This review covers the history on Biological Nitrogen Fixation (BNF) in Graminaceous plants grown in Brazil, and describes research progress made over the last 40 years, most of which was coordinated by Johanna Döbereiner. One notable accomplishment during this period was the discovery of several nitrogen-fixing bacteria such as the rhizospheric (Beijerinckia fluminensis and Azotobacter paspali), associative (Azospirillum lipoferum, A. brasilense, A. amazonense) and the endophytic (Herbaspirillum seropedicae, H. rubrisubalbicans, Gluconacetobacter diazotrophicus, Burkholderia brasiliensis and B. tropica). The role of these diazotrophs in association with grasses, mainly with cereal plants, has been studied and a lot of progress has been achieved in the ecological, physiological, biochemical, and genetic aspects. The mechanisms of colonization and infection of the plant tissues are better understood, and the BNF contribution to the soil/plant system has been determined. Inoculation studies with diazotrophs showed that endophytic bacteria have a much higher BNF contribution potential than associative diazotrophs. In addition, it was found that the plant genotype influences the plant/bacteria association. Recent data suggest that more studies should be conducted on the endophytic association to strengthen the BNF potential. The ongoing genome sequencing programs: RIOGENE (Gluconacetobacter diazotrophicus) and GENOPAR (Herbaspirillum seropedicae) reflect the commitment to the BNF study in Brazil and should allow the country to continue in the forefront of research related to the BNF process in Graminaceous plants.

Keywords
bacterial endophytes, diazotrophs, semi-solid N-free medium, inoculation, cereals, grass plants.